Title Page

Personality and Games:
Enhancing Online Surveys through Gamification

Tamilla Triantoro*
Quinnipiac University
Assistant Professor
Department of Computer Information Systems
School of Business

275 Mt Carmel Ave.
Hamden, CT 06518
tamilla.triantoro@qu.edu
203-582-7278

Raquel Benbunan-Fich
Baruch College. CUNY
Associate Professor
Paul H. Chook Department of
Information Systems & Statistics
Zicklin School of Business

One Bernard Baruch Way
New York, NY 10010
rbfich@baruch.cuny.edu
646-312-3375

*Corresponding Author

Ram Gopal
The University of Warwick
Professor
Information Systems and Management
Warwick Business School

Coventry
CV4 7AL, UK
Email: ram.gopal@wbs.ac.uk
024 761 50164

Guido Lang
Quinnipiac University
Associate Professor
Department of Computer Information Systems
School of Business

275 Mt Carmel Ave.
Hamden, CT 06518
guido.lang@qu.edu
203-582-6555

Abstract

In this research, we evaluate the moderating role of personality on enjoyment and attention associated with a gamified data collection instrument, and the attractiveness of a surveying organization. In an online experiment, we compare a gamified survey with a traditional survey. The results suggest that gamified surveys are more enjoyable and users are more attentive when filling out gamified surveys. Specific personality traits moderate the effect of attention and enjoyment related to gamification, and the enjoyment associated with gamification increases the attractiveness of a surveying organization. These findings have theoretical and practical implications to improve the design of existing online surveys.

Keywords: Gamification, Big Five Personality Traits, Online Surveys, User Experience Design, Human Computer Interaction.

Personality and Games:
Enhancing Online Surveys through Gamification

Abstract

In this research, we evaluate the moderating role of personality on enjoyment and attention associated with a gamified data collection instrument, and the attractiveness of a surveying organization. In an online experiment, we compare a gamified survey with a traditional survey. The results suggest that gamified surveys are more enjoyable and users are more attentive when filling out gamified surveys. Specific personality traits moderate the effect of attention and enjoyment related to gamification, and the enjoyment associated with gamification increases the attractiveness of a surveying organization. These findings have theoretical and practical implications to improve the design of existing online surveys.

Keywords: Gamification, Big Five Personality Traits, Online Surveys, User Experience Design, Human Computer Interaction.

1 Introduction

With the growth in data capturing capabilities at a relatively low cost, a larger number of organizations routinely collect data about users of their services and conduct analytics to enhance service offerings and the company bottom-line. User self-reported data can influence important business decisions, including marketing campaigns, job offers, and consumer product development. The need to get high quality user self-reported data therefore has practical significance and calls for the design and improvement of existing data collection instruments.

A traditional way of obtaining user data is via surveys. Surveys have certain advantages as they are relatively inexpensive, can be administered online and provide structured data that are easy to analyze (Schmidt 1997). At the same time, data collectors face challenges associated with low user motivation. Lacking motivation, users may not respond to a call for a survey, and even if they do, they may submit responses with missing or inaccurate data that can result from common scale bias, acquiescence bias, extreme responding bias, or social desirability bias (Podsakoff et al. 2013, Podsakoff et al. 2003).

We propose that gamifying surveys, by adding game elements to a traditional survey, may provide a more enjoyable environment for respondents and mitigate survey related biases. Gamification is the adoption of games beyond entertainment and is based on the usage of games in our daily lives. Our main contention in this research is that properly designed gamified systems have the ability to improve current approaches to data collection from users. We propose that gamification, or the use of gaming mechanics in non-gaming contexts, will provide more enjoyment for respondents, will increase their attention, and consequently, will provide a better perception of the surveying organization. To address these propositions, we designed a gamified system that is capable of capturing user personality data based on the Big Five personality traits: agreeableness, conscientiousness, extraversion, neuroticism and openness to experience (McCrae and John 1992). As more organizations are turning to psychometric assessments to better understand their user base, we are seeking to investigate if specific personality characteristics affect attention and enjoyment when filling out gamified surveys compared to traditional surveys, and if the design of survey instrument matters.

By suggesting an alternative approach to user data collection via a newly developed gamified system and validating measures of personality obtained via the system, we contribute to both research and practice. First, we develop a gamified system that is capable of capturing user personality data. Second, we explore if personality traits have a moderating effect on the perceptions of gamified systems and impressions of the surveying organization. We empirically demonstrate that gamified systems are able to capture user personality data, provide more enjoyment for users, and increase the attractiveness of a surveying organization. To the best of our knowledge, this is the first study that evaluates the effect of personality traits on perceptions of gamified surveys.

The remainder of this paper is structured as follows: first, we introduce gamification. Then, we present the Big Five framework and its relationship to the attention and enjoyment associated with gamified surveys. Against this backdrop, we discuss the methodology and results of our analyses, and present implications for theory and practice. We follow with a discussion of the study limitations, suggested areas for future research, and overall conclusions of this study.

2 User Data and Gamification

Data about user preferences inform business decisions, marketing campaigns, online offers, product development and many other areas. Typically, user data are collected via online surveys. However, existing surveys are subject to limitations, such as not paying enough attention to questions (Podsakoff et al 2003). Uninterested users may not respond to a call for a survey, and even if they do, they may submit surveys with missing or inaccurate data. Incomplete and inaccurate responses are rarely useful as they do not represent actual opinions of users. Given recent trends in gamification, we propose that adding game elements to a traditional survey (i.e. gamifying surveys), may provide a more enjoyable environment for respondents, increase their attention, and mitigate survey-related response biases.

Gamification refers to designing information systems that influence user behavior by affording experiences and motivations similar to those in games (Koivisto and Hamari 2019). Common game elements used in gamification are badges, scores, trophies, rankings, reputation points, group tasks, goals, and avatars (Blohm and Leimeister 2013). Blohm and Leimeister (2013) classified gamification as game mechanics, game dynamics, and game motives. Game mechanics are the use of game elements for designing a gamified system. Game dynamics describe the effect of mechanics on user experience such as competition or collaboration. Game motives refer to internal driving forces that encourage people to play the game. More recently, Liu et al. (2017) proposed two broad categories for gamification design - gamification objects and gamification mechanics. Gamification objects refer to the building blocks of gamification systems such as avatars, graphics, animation, audio effects, virtual items, storylines, badges and

leaderboards. Gamification mechanics describe play patterns and dynamics and include level systems, point systems, quests, competitions, and collaborations in the game. According to Tang and Zhang (2019), each gamification object affords different motivations. For example, badges, points, scores, levels, and prizes are used to indicate performance status; storyline, mission, avatar and role-play engage players into the essence of the game; social features and collaboration indicate social significance and influence of players; while graphics, animation, sound effects, and customization enhance the quality of gameful experience.

Due to the potential of gamification to increase motivation and engagement, gamification has gained popularity in various areas, and has been implemented in research in learning and education (Christy and Fox 2014, de Markos et al. 2014), marketing and advertising (Xi and Hamari 2019), enterprise resource planning (Alcivar and Abad, 2016), public engagement (Tolmie et al. 2014), climate change education (Lee et al. 2013), health (Jones et al. 2014), fitness and exercise (Lister et al. 2014), and other areas.

Research in online survey gamification has also been gaining popularity. Gamification in the context of surveys is defined as the application of game mechanics to an interaction with survey respondents (Downes-Le Guin et al. 2012). The following game elements are mainly used in gamified surveys – clear rules and goals, a storyline, challenging tasks or quests, feedback or rewards, and attractive design (Keusch and Zhang, 2017). Most of the studies in gamified surveys were conducted in the market research domain (Keusch and Zhang, 2017). For example, Bailey et al. (2015) used a panel of UK grocery shoppers to evaluate the length of open-end questions and survey response time in the grocery shopping setting. Brownell et al. (2015) evaluated dropout rate and survey completion time using an online panel in the cell phone packages context. Cechanowicz et al. (2013) evaluated survey completion and length of open-end questions using an online panel in the context of mobile phone provider advertising. Downes-Le Guin et al. (2012) tested completion rates, response distribution and survey completion time using an online panel in the context of energy and environment. Mavletova (2015) and Harms et al. (2014) tested gamified surveys with children and young adults. They found that gamified surveys had lower response rates, took longer to complete and were associated with more fun and ease of understanding. Our work is fundamentally different from previous studies. First, in addition to evaluating the gamification effect in online surveys, we evaluate the attractiveness of a surveying organization. As there may be a spillover effect between the tools that organizations utilize and the perceptions of these organizations, it is important to know if gamified design hurts or improves the organizational image. Second, we measure enjoyment and attention associated with gamified online surveys via the lens of user personality. User personality has been a topic of significant academic interest across many fields (Adamopoulos et al. 2018). Understanding the user personality in information systems is instrumental in designing personalized approaches to interactive systems. In the following sections, we present the effect of gamification on online surveys and perception of surveying organization, as well as the effect of personality on perceptions of online surveys.

2.1 Gamification and Online Surveys

Gamification influences cognitive, sensory and functional experiences of users (Tang and Zhang 2019). To make information systems more exciting, system designers are turning to gamifying existing solutions by adding game elements. Traditional utilitarian systems that aim exclusively at productivity are being replaced with hedonic systems that promote productivity through having fun (Koivisto and Hamari 2019). The advantage of gamified systems is that game elements influence the psychological processes of immersion and game engagement, as well as user perceptions derived from the game experience such as enjoyment and involvement (Li et al. 2014). As a result, most gamified systems provide both utilitarian benefits such as productivity, and hedonic benefits such as enjoyment (Hamari and Koivisto 2015). Gamification has been increasingly used to enhance user enjoyment by adding fun to information systems (Suh et al 2017), and creating experiences of enjoyment to improve interactions with existing systems (Koivisto and Hamari 2019). Adding game elements to a traditional online survey design may increase enjoyment associated with filling out online surveys. Thus, we propose:

H1: Gamification will increase enjoyment associated with online surveys.

Incorporating engagement of the gameful process into activities outside games is at the core of gamification (Koivisto and Hamari 2019). According to Werbach and Hunter (2012) there are three kinds of activities for which gamification can be particularly useful. They include creative work, mundane tasks, and behavior change. As filling out surveys may turn into a repetitive task and lead to decreased attention (Podsakoff et al 2003), adding game elements may enliven the survey and increase levels of attention while answering the survey. Therefore, we propose that gamified surveys will promote user attention. More formally:

H2: Gamification will increase attention while filling out online surveys.

Gamification has been increasingly used to enhance user enjoyment (Suh et al. 2017). A survey sent by an organization may be perceived as direct interaction with a company. Thus, if a survey is fun and enjoyable, there may be a spillover effect from perceived survey enjoyment to perceived attractiveness of the surveying organization. The design of a survey may influence perceptions toward the organization, organizational attitudes, and organizational attractiveness. In a similar vein, we advocate that if gamified systems are perceived as enjoyable, the surveying organization may be perceived as more attractive. Therefore, we propose:

H3: Enjoyment associated with gamified surveys will increase the attractiveness of a surveying organization.

The user attraction to a surveying organization may be influenced by information about a company's characteristics revealed during survey-related activities. If the number of positive inferences about the surveying organization is high, a user will more likely identify with the surveying organization, and consequently find the organization more attractive. If a surveying organization provides a survey instrument that keeps user attention longer, there is a possibility that users may perceive a surveying organization as more attractive. Thus, we propose:

H4: Attention to a gamified survey will increase the attractiveness of a surveying organization.

2.2 User Personality and Online Surveys

The effects of survey gamification may be contingent upon individual user characteristics, such as personality traits. "Personality is all of the attributes, qualities and characteristics that distinguish the behavior, thoughts, and feelings of individuals" (Saucier and Srivastava 2015, p. 283). Personality affects various aspects of human behavior (Adamopoulos et al. 2018), including career mobility and career success (Gattiker and Larwood 1998, Seibert and Kraimer 2001), leadership (Judge et al. 2002a), job satisfaction (Judge et al. 2002b, academic success (Noftle and Robins 2007), work-family balance (Wayne et al. 2004), and product preferences (Buettner 2017).

The Big Five personality dimensions present a taxonomy of personality traits. These dimensions are derived from the analyses of natural language terms that people use to describe themselves (John and Srivastava 1995). The Big Five is considered the most widely accepted taxonomy of personality traits in psychology research (Almlund et al. 2011). It consists of a five-factor structure that is typically labeled as Agreeableness, Conscientiousness, Extraversion, Neuroticism and Openness to Experience (John and Srivastava 1999). The Big Five factors are usually viewed in a continuum. A person who is high in one dimension, for example extraversion, typically scores lower in introversion which is another dimension of this factor.

Agreeableness epitomizes helpful, compliant, generous, kind, and cooperative behavior (McCrae and John 1992). People who score high in agreeableness are generally easy going and sympathetic to others. People who score low in agreeableness are argumentative, stubborn, hostile and antagonistic. Agreeable people are prone to develop positive relations with others (Barrick et al. 2002) and show empathy towards other people (Nettle 2006). Agreeable people are more likely to form friendships (Selfhout et al. 2010). At the workplace, agreeable people may value interests of others more than their own (Wille et al. 2010), and may follow rather than lead (Boudreau et al. 2001).

Conscientiousness characterizes individuals who are highly organized, dutiful, persistent, methodical, and determined (McCrae and John 1992). People who score low on this factor are often careless. Conscientious people are habitually chosen as work partners because of their competency and tendency to be hardworking. Prior research concluded that conscientiousness shows a consistent relationship with job performance criteria for such occupational groups as professionals, police, managers, sales and skilled/semi-skilled jobs (Barrick and Mount 1991), and for conventional jobs such as accounting and farming (Gottfredson et al. 1993). Conscientious employees are found to stay on their current jobs due to sense of responsibility and higher dependability (Ng et al. 2005), and are less likely to seek novel job opportunities, because of risk aversion and cautiousness (Nieß and Zacher 2015).

Extraversion refers to personality traits that reflect how outgoing, active, gregarious, assertive and energetic the person is (McCrae and John 1992). Extraverts are sensitive to rewards and social attention, and participate in various social activities (Ashton et al. 2002). The extraverts' behavior may suggest a larger network of friends (Fang et al. 2015). However extraverts were found to fail to attract friends over time (Selfhout et al. 2010), and their perceived status was found to have a tendency to decline over time (Bendersky and Shah 2013). The opposite of extraversion is introversion that is expressed in a more reserved and self-contained behavior. People who are extraverts prefer public activities, participate in team activities and enthusiastically communicate with other people. Extraversion is a valid predictor for occupations that involve social interactions such as managers and sales (Barrick and Mount 1991), teaching or business management (Ackerman and Heggestad 1997), and leadership roles in multiple settings (Judge, et al. 2002).

Neuroticism denotes the dimension of emotional stability. Neurotic people are unstable, insecure and easily irritable (McCrae and John 1992). They exhibit frequent mood swings, can be difficult to deal with, and are often upset about their daily routine. Opposite of this dimension is emotional stability. People with a higher emotional stability are calm and may be effective leaders (Judge et al. 2002a). Neurotic people often express negative emotions and are likely to be avoided (Fang et al. 2015). Neurotic employees may have low self-esteem and thus look for positive environment elsewhere, consequently, neuroticism is a good predictor for job changes (Feldman and Ng 2007).

Openness to experience is associated with individuals who are interested in new things, are liberal, intellectual, open-minded, and imaginative (McCrae and John 1992). People with high openness have diverse interests and express tiredness from social experiences with conventional people, and thus, may have limited number of friends (Fang et al. 2015). At the same time, open people are considered more exciting conversational partners (Kashdan et al. 2011), and may be sought after for friendship (Fang et al. 2015). Those who score low in openness tend to be more conforming, conventional and conservative. Openness to experience is positively related to upward job changes into managerial and professional positions (Nieß and Zacher 2015), but also related to greater job instability (Wille et al. 2010).

Considering the differences in human personality and their effect on various aspects of human behavior, we expect that users with different personalities may perceive gamification differently. Thus, we propose:

H5: User personality traits will moderate the effect of gamification on user enjoyment.
H6: User personality traits will moderate the effect of gamification on user attention.

Figure 1 depicts our research model. Gamified online surveys will influence user enjoyment and attention that consequently will influence the attractiveness of a surveying organization. At the same time, user personality will have a moderating effect on enjoyment and attention associated with online surveys.

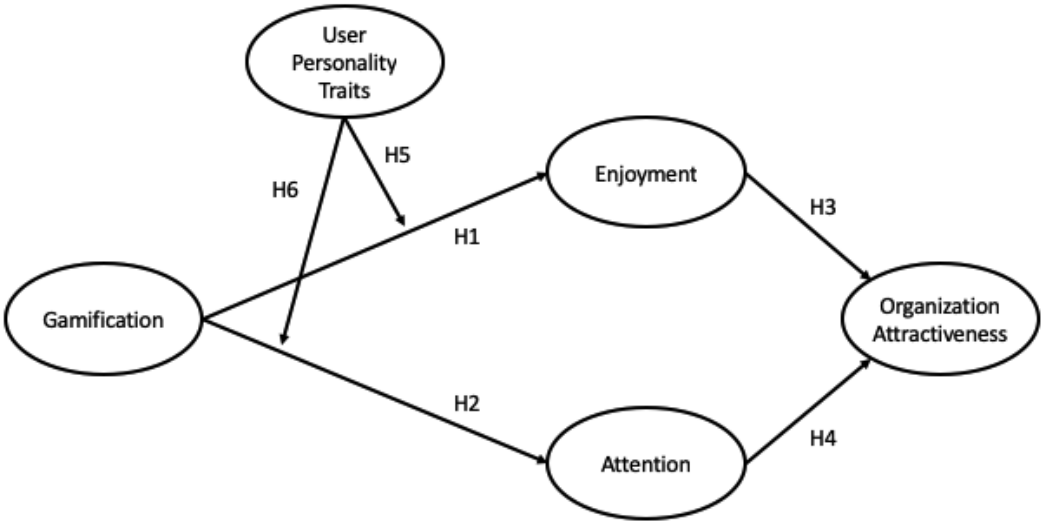

Figure 1. The Research Model[1]

3 Methodology

To test our assumptions, we created two surveys. The first survey followed a traditional online design and was developed using a commercially available platform Qualtrics. The survey contained 44 Big Five personality questions

[1] *We are thankful to the anonymous reviewer for offering an alternative model for this study*

(John and Srivastava 2011) presented in the form of Likert scales ranged from 1 to 5. The second survey was custom built using HTML and posted on the web. It contained 15 gamified personality questions based on the Big Five scale (John and Srivastava 2011). The participants filled out surveys in a random order. In the gamified/traditional survey group, participants first completed the gamified personality survey, then they completed the traditional Likert-based personality survey. Then they reported how much attention they paid to each survey, and how enjoyable each of the surveys was. Lastly, we asked the participants, if hypothetically speaking, these surveys were a part of a job application form of two different companies, which one would be more attractive to them. In the traditional/gamified survey group, participants used a reversed order. First they completed the traditional survey, followed by the gamified survey, and then answered attention, enjoyment and organization attractiveness questions.

While the traditional survey utilized Likert scales for all questions, the gamified survey contained the following game elements: avatar, animation, challenge, timer, and scoring system. Both surveys required a respondent to assume a role of a team player with a purpose to help a hypothetical team to get a higher score by solving puzzles. In the gamified version, respondents created an avatar and then went through fifteen personality-related questions presented in the context of a game (see Figure 2). Next, they solved five puzzles (Carter 2007), and received points for correct answers. The design and overall look of the gamified survey was informed by the analysis of existing solution-based games. Examples of solution games are graphic adventures, textual adventures, and games that have puzzle qualities (Fullerton 2014). The game narrative adopted for this study is a combination of textual adventure and problem-solving games.

Following the classification in Liu et al. (2017), the gamified survey developed for this study contained the following objects and mechanics:

- **Game Objects** – avatar, graphics, animation, storyline. Schobel et al. (2016) found that four game objects are an ideal combination to provide a sufficient gamified experience.
- **Game Mechanics** - point system, quest, competition, collaboration.

The motivation in the game was based on intellectual curiosity, cognitive stimulation, and achievement. Players were not instructed of the content of the game, and had to discover the challenges on their own as the game progressed. At the end of the gamified survey, participants answered demographic questions, completed the attention and enjoyment scale (O'Brien and Toms, 2010), and organization attractiveness scale. To reduce the concern of response set and acquiescence bias (Podsakoff et al. 2013) several items were measured with reverse scales.

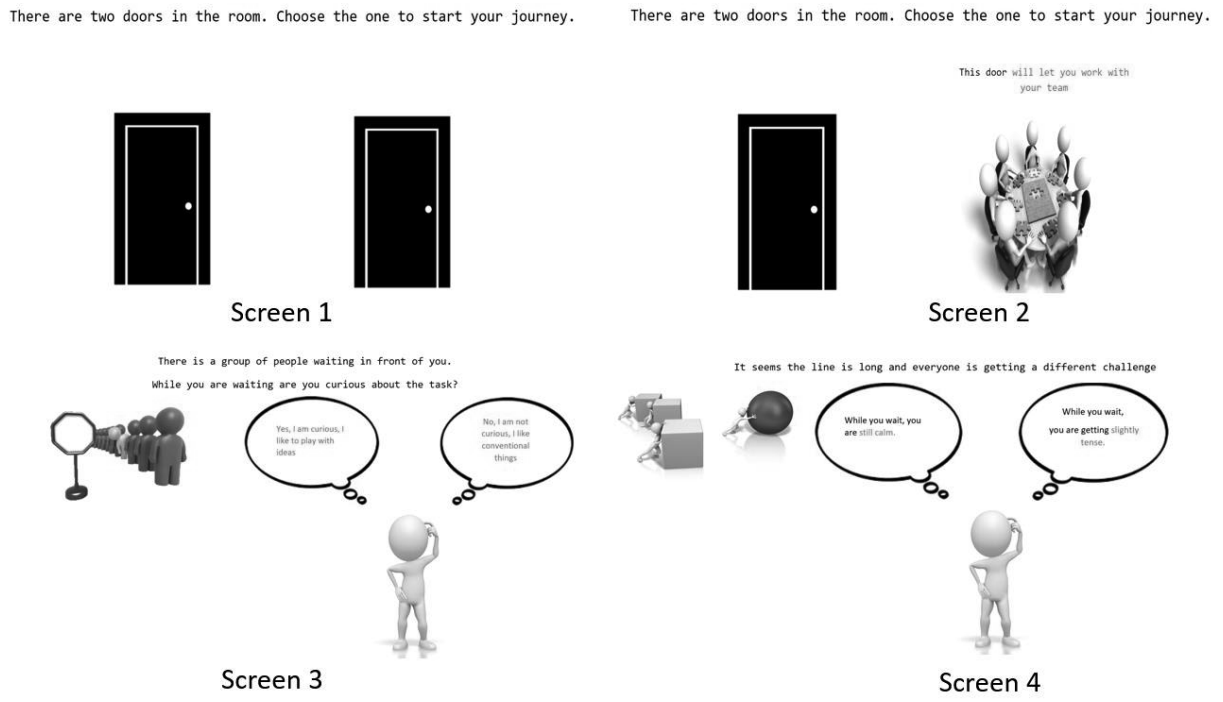

Figure 2. Example of 4 different consecutive steps in the gamified survey. A player starts with choosing the door, and then progresses to personality questions built in the game (Note: the figures are animated in the actual survey).

Participants were recruited from a large urban college in the Northeast of the U.S., and were randomly assigned to one of the two established conditions. The first condition was a gamified survey, followed by a traditional survey, whereas the second condition offered a traditional survey first, followed by a gamified survey. Each participant completed both surveys in random order. The experimental treatment was administered online, including the instructions on how to proceed, to avoid experimenter effects and to ensure that all participants received the same information. From each respondent, we collected personality data from both the gamified and traditional survey as well as demographic information. Each respondent contributed to two data points – one about the gamified survey and the other about the traditional survey. Although each respondent completed both the gamified and traditional survey in a random order, we only used the data from whichever survey came first. So, for example, if a respondent completed the gamified survey and then the traditional survey, only the data from the gamified survey was used for that respondent. The study sample consisted of 694 participants. Fifty-one percent (354) of respondents were female and 49 percent (340) were male. The majority of the respondents were between 18-24 years old (83%), 14% of respondents were 25-34 years old. To evaluate the effectiveness of the random assignment, we fitted a logistic regression model with all demographic variables predicting an experimental group dummy variable. The McFadden R2 index of .124 suggests a poorly fitting model. Thus, we conclude that there are no significant differences in demographics between the two experimental conditions.

4 Results

The data were analyzed using partial least squares path modeling in R (plspm package version 0.4.9). An independent dummy variable, gamification, was created by coding 0 for the traditional survey condition and 1 for the gamified survey treatment condition. A two-step approach based on the recommendations by Henseler, Hubona, and Ray (2016) was used: First, the reliability and validity of the measurement model was established. Second, the path coefficients of the model were evaluated using a bootstrapping method with 100 samples. After removing low loading items, the resulting model exhibits favorable construct reliability (i.e. Dillon-Goldstein's ρ > 0.7, 1st eigenvalue > 1, 2nd eigenvalue < 1, see Table 1) and discriminant validity (i.e. inter-construct correlations < square root of average variance extracted, see Table 2).

Table 1. Descriptive statistics and reliability measures

	Min	Max	M	SD	ρ	1st eigenval	2nd eigenval
Gamification	0.000	1.000	0.558	0.497	1.000	1.00	0.000
Agreeableness	1.000	5.000	3.903	0.718	0.967	2.72	0.141
Conscientiousness	1.000	5.000	4.064	0.703	0.798	1.72	0.804
Extraversion	1.000	5.000	3.460	0.896	0.746	1.49	0.830
Neuroticism	1.000	5.000	2.490	0.828	0.798	1.71	0.661
Openness	1.515	5.000	3.796	0.708	0.742	1.48	0.860
Enjoyment	1.000	5.000	3.418	0.976	0.945	2.56	0.239
Attention	1.000	5.000	3.330	0.956	0.875	2.10	0.540
Organization Attractiveness	1.000	2.000	1.689	0.430	0.951	2.60	0.280

Table 2. Inter-construct correlations

	1	2	3	4	5	6	7	8	9
1. Gamification	**1.000**								
2. Agreeableness	0.925	**0.951**							
3. Conscientiousness	-0.492	-0.370	**0.746**						
4. Extraversion	-0.258	-0.191	0.295	**0.704**					
5. Neuroticism	0.156	0.093	-0.179	0.117	**0.719**				
6. Openness	-0.075	-0.037	0.223	0.209	-0.104	**0.666**			
7. Enjoyment	0.029	0.048	0.161	0.155	0.170	0.147	**0.923**		
8. Attention	0.036	0.070	0.135	0.054	0.067	0.136	0.621	**0.794**	
9. Organization Attractiveness	0.118	-0.084	0.134	0.118	-0.090	0.050	0.174	0.123	**0.931**
Note: Values shown in bold on the diagonal are the square root of the average variance extracted.									

To test the hypotheses, we evaluated the corresponding path coefficients in the path model. The results are shown in Figure 3.

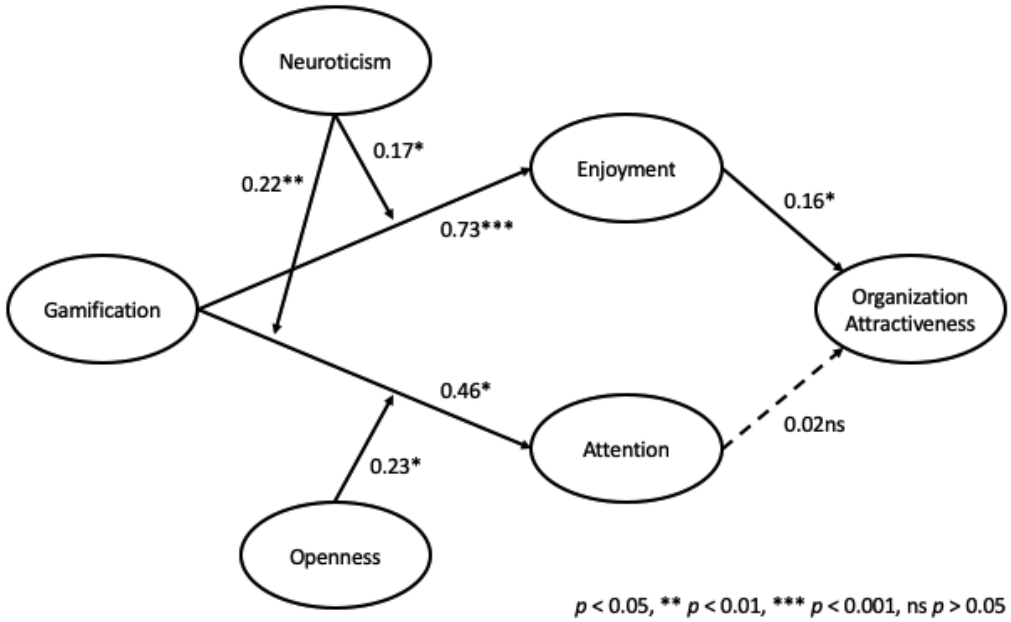

Figure 3. Results of path analysis

As can be seen in Figure 3, the path from gamification to enjoyment is positive and significant (β = 0.729, SE = 0.213, p < 0.001). As hypothesized, it appears that gamification increases survey enjoyment. Thus, H1 is supported. Likewise, the path from gamification to attention is significant (β = 0.459, SE = 0.218, p < 0.05). As expected, it appears that gamification does increase attention while filling out surveys. Hence, H2 is supported. The path from enjoyment to company attractiveness is likewise positive and significant (β = 0.159, SE = 0.049, p < 0.05). Stated differently, the higher the enjoyment caused by gamification, the higher the perceived attractiveness of the surveying organization. Thus, H3 is supported. However, contrary to expectations, the path from attention to organization attractiveness is not significant (β = 0.024, SE = 0.049, p > 0.05). This suggests that higher levels of attention in the online survey caused by gamification do not increase the perceived attractiveness of the surveying organization. Hence, H4 is not supported.

The significant results of the hypothesized moderating effects of user personality traits on the relationships between gamification and enjoyment (H5) as well as gamification and attention (H6) provide evidence that specific personality traits have a moderating effect on attention and enjoyment. Figure 3 depicts the factors with significant moderating effects. As can be seen, neuroticism positively moderates the effect of gamification on enjoyment (β = 0.170, SE = 0.039, p < 0.001). In other words, the higher the level of neuroticism, the stronger the effect of gamification on enjoyment. In addition, neuroticism also positively moderates the effect of gamification on attention (β = 0.217, SE = 0.074, p < 0.01). Hence the higher the level of neuroticism, the stronger the effect of gamification on attention. Moreover, openness also positively moderates the effect of gamification on attention (β = 0.227, SE = 0.112, p < 0.05). Stated differently, the effect of gamification on attention is strengthened for subjects with higher levels of openness. Thus, H5 and H6 are partially supported as personality indeed moderates the effect of gamification on attention and enjoyment.

To understand which game elements are perceived as most enjoyable and gameful, we assessed the item averages for perceived enjoyment and gamefulness of each game element (i.e. animation, avatar, challenge, timer, and points). All game elements were rated using a 1-5 star rating. Although all game elements were rated favorably with regards to perceived enjoyment, animation was rated as the most enjoyable and timer as the least enjoyable game element. With regards to perceived gamefulness, avatar was rated as the most gameful while the challenge element was rated the least gameful element. Table 3 contains means and standard deviations for each item.

Table 3. Descriptive statistics for perceived enjoyment and gamefulness of game elements

	Enjoyment		Gamefulness	
	M	**SD**	**M**	**SD**
Animation	3.811	1.304	3.815	1.328
Avatar	3.591	1.382	3.848	1.355
Challenge	3.658	1.300	3.795	1.277
Timer	3.082	1.467	3.795	1.332
Points	3.311	1.414	3.762	1.288

5 Discussion and Conclusion

This research is motivated by two complementary research questions. First, whether user personality moderates the effects of gamification on attention and enjoyment. Second, whether a gamified survey can influence the attractiveness of a surveying organization. To address these questions, we employ the Big Five personality framework: agreeableness, conscientiousness, extraversion, neuroticism and openness to experience (McCrae and John 1992), and evaluate the moderating effect of personality traits on the attention and enjoyment associated with gamified surveys and the attractiveness of a surveying organization.

We found that a gamified version of our survey indeed increased both attention and enjoyment. This finding is important as one of the challenges in collecting data via online surveys is a lack of attention and motivation associated with the monotonous design of current survey systems. As gamification has the potential to increase the level of attention and enjoyment while filling out surveys, it has implications for the design of future surveys.

When playing a game, the process is often enjoyable regardless of the outcome (Koivisto and Hamari 2019). We found that all personalities experience increased enjoyment associated with gamified surveys, however individuals who score high in neuroticism exhibit even more enjoyment. Regarding attention, we found that the moderating effect is more pronounced for individuals who are more open to experience and for those who score high in neuroticism. Due to their novelty, gamified surveys could be perceived as more interesting and attract the attention of individuals high in openness. Contrary to our expectations, attention does not increase the attractiveness of a surveying organization. However, the enjoyment associated with gamification increased the attractiveness.

We also conducted a deeper analysis of game elements to show the contribution of each feature to promote positive perceptions. The use of visuals such as animation and avatars in our custom-developed gamified environment were rated as the most enjoyable game elements. Timer and points were found slightly less enjoyable, mostly because of the constraint and competitive nature of both game elements.

As more organizations require high quality user self-reported data, gamification can be used to increase enjoyment and attention towards current data collection instruments. Surveys may communicate information about the company's structure, culture, and values. This communication is helpful in reducing the information asymmetry between organizations and users. When users find a survey enjoyable, it affects their evaluation of an organization. That is how gamification adds value. However, it is important to use gamification wisely by developing games that elicit meaningful information and work well. Gamification for the sake of providing a game, or games that do not function reliably may actually tarnish the image of a company. Viewed as a presentation card, an organization should carefully evaluate the objectives of using gamification and thoroughly test it to ensure alignment its business objectives and strategic priorities.

From the theoretical standpoint, this study introduces a new context for personality and gamification in the area of online surveys. We use the Big Five personality framework to provide a better understanding of how different personality traits view gamified systems. The findings suggest that a surveying organization may benefit from using gamification because gamified surveys increase the attractiveness of a surveying company. At the same time, users also benefit from a gamified solution but the effects are stronger depending upon specific personality traits; individuals who exhibit neuroticism experience stronger benefits related to enjoyment and attention, while those who are open to experiences exhibit more focused attention.

The results reported herein have limited generalizability due to the nature of the IT artifact (gamified survey) and the participant population (students). We custom-designed a novel gamified survey that proved to be enjoyable for participants. Other gamified systems with alternative designs may yield different results. Similarly, our subject population (college age students) may be particularly inclined to play games and prefer gamified environments. Nevertheless, many organizational efforts are intended to attract millennials, and thus we view this as a strength instead of a limitation of our results.

By suggesting an alternative approach to user data collection through a gamified survey we contribute to research and practice. We demonstrate the importance of gamification to enhance the attractiveness of a surveying organization. We also show how specific individual characteristics implemented via personality traits interact with the main proposed benefits of gamified surveys (enjoyment and attention). Further research may take into consideration different operationalization of individual characteristics to extend the evaluation of effects of gamified surveys. As a side benefit, the collection of personality characteristics in itself might be useful for organizations seeking to understand their customers better, or to customize their product/service offerings to specific user groups.

This study investigates a novel approach to collect data via gamified surveys and evaluates its effects on enjoyment and attention contingent upon personality characteristics of the respondents. Understanding this approach has the potential to improve the design of existing online survey systems across various organizational initiatives. We focus on a relatively new opportunity of using gamified online surveys to collect personality data and evaluate the attractiveness of a surveying organization. Gamified surveys offer a number of advantages over traditional surveys. They drive attention and enjoyment, and subsequently increase the attractiveness of a surveying organization. Businesses may find gamification to be a valuable tool to deploy in their ongoing attempts to improve current online survey systems.

6 References

[1] P.L. Ackerman, and E.D. Heggestad, Intelligence, personality, and interests: Evidence for overlapping traits. Psychological bulletin, vol. 121, no. 2, pp. 219, 1997.

[2] P. Adamopoulos, A. Ghose, and V. Todri, The impact of user personality traits on word of mouth: text-mining social media platforms. Information Systems Research, vol. 29, no. 3, pp. 612-640, 2018.

[3] I. Alcivar, A.G. Abad, Design and evaluation of a gamified system for ERP training. Computers in Human Behavior, vol. 58, pp. 109-118, 2016.

[4] M. Almlund, A.L. Duckworth, J.J. Heckman, and T.D. Kautz, Personality psychology and economics. In E.A. Hanushek, S. Machin, L. Wößmann (eds.) Handbook of the Economics of Education. vol 4. Amsterdam, Netherlands: Elsevier, 2011, pp. 1–181.

[5] M.C. Ashton, K. Lee, and S.V. Paunonen, What is the central feature of extraversion? Social attention versus reward sensitivity. Journal of personality and social psychology, vol. 83, no. 1, pp. 245, 2002.

[6] P. Bailey, G. Pritchard, H. Kernohan, Gamification in market research. Increasing enjoyment, participant engagement and richness of data, but what of data validity? International Journal of Market Research, Vol. 57, pp. 17–28, 2015.

[7] M.R. Barrick, and M.K. Mount, The big five personality dimensions and job performance: a meta-analysis. Personnel psychology, vol. 44, no. 1, pp. 1-26, 1991.

[8] M.R. Barrick, G.L. Stewart, and M. Piotrowski, Personality and job performance: test of the mediating effects of motivation among sales representatives. Journal of Applied Psychology, vol. 87, no. 1, pp. 43, 2002.

[9] C. Bendersky, and N.P. Shah, The downfall of extraverts and rise of neurotics: The dynamic process of status allocation in task groups. Academy of Management Journal, vol. 56, no. 2, pp. 387-406, 2013

[10] I. Blohm, and J.M. Leimeister, Gamification: Design of IT-Based Enhancing Services for Motivational Support and Behavioral Change. Business Information Systems Engineering, vol. 5, no. 4, pp. 275–278, 2013.

[11] J.W. Boudreau, W.R. Boswell, and T.A. Judge, Effects of personality on executive career success in the United States and Europe. Journal of vocational behavior, vol. 58, no.1, pp. 53-81, 2001.

[12] B. Brownell, J. Cechanowicz, C. Gutwin, Gamification of survey research: Empirical results from gamifying a conjoint experiment. In T. Reiners & L. C. Wood (Eds.), Gamification in education and business (pp. 569–591). Cham, Switzerland: Springer. 2015.

[13] R. Buettner, Predicting user behavior in electronic markets based on personality-mining in large online social networks. Electronic Markets, vol. 27, no. 3, pp. 247-265, 2017.

[14] P. Carter, IQ and Aptitude Tests. Kogan Page Limited, 2007.

[15] K.R. Christy, J. Fox, Leaderboards in a virtual classroom: A test of stereotype threat and social comparison explanations for women's math performance. Computers & Education, vol. 78, pp. 66-77, 2014.

[16] J. Cechanowicz, C. Gutwin, B. Brownell, L. Goodfellow, L. Effects of gamification on participation and data quality in a real-world market research domain. In Proceedings of the first ACM international conference on gameful design, research, and applications, pp. 58-65, 2013.

[17] L. de-Marcos, A. Domínguez, J. Saenz-de-Navarrete, C. Pagés, An empirical study comparing gamification and social networking on e-learning. Computers & Education, vol. 75, pp. 82-91, 2014.

[18] T. Downes-Le Guin, R. Baker, J. Mechling, E. Ruylea, Myths and realities of respondent engagement in online surveys. International Journal of Market Research, vol. 54, pp. 613–633, 2012.

[19] R. Fang, B. Landis, Z. Zhang, M.H. Anderson, J.D. Shaw, and M. Kilduff, Integrating personality and social networks: A meta-analysis of personality, network position, and work outcomes in organizations. Organization Science, vol. 26, no. 4, pp. 1243-1260, 2015.

[20] D.C. Feldman, and T.W. Ng, Careers: Mobility, embeddedness, and success. Journal of management, vol. 33, no. 3, pp. 350-377, 2007.
[21] T. Fullerton, Game design workshop: a playcentric approach to creating innovative games. CRC press, 2014.
[22] U.E. Gattiker, and L. Larwood, Predictors for managers' career mobility, success, and satisfaction. Human Relations, vol. 41, no. 8, pp. 569–591, 1988.
[23] G.D. Gottfredson, E.M. Jones, and J.L. Holland, Personality and vocational interests: The relation of Holland's six interest dimensions to five robust dimensions of personality. Journal of Counseling Psychology, vol. 40, no. 4, pp. 518, 1993.
[24] J. Hamari, and J. Koivisto, Why do people use gamification services? International Journal of Information Management, vol. 35, no. 4, pp. 419-431, 2015.
[25] J. Harms, S. Biegler, C. Wimmer, K. Kappel, T. Grechenig, Gamification of online surveys: Design process, case study, and evaluation. In Human-Computer Interaction. Springer, Cham, 219-236, 2018.
[26] J. Henseler, G. Hubona, and P.A. Ray, (2016). Using PLS Path Modeling in New Technology Research: Updated Guidelines. Industrial Management & Data Systems, vol. 116, no. 1, pp. 2-20, 2016.
[27] O.P. John, and S. Srivastava, The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin and O. P. John (Eds.), Handbook of personality: Theory and research New York: Guilford Press, 2, 2011, pp. 102-138.
[28] B.A. Jones, G.J. Madden, H.J. Wengreen, The FIT game: Preliminary evaluation of a gamification approach to increasing fruit and vegetable consumption in school. Preventive Medicine, 68, pp. 76-79, 2014,
[29] T.A. Judge, C.A. Higgins, C.J. Thoresen, and M.R. Barrick, The big five personality traits, general mental ability, and career success across the life span. Personnel psychology, vol. 52, no. 3, pp. 621-652, 1999.
[30] T.A. Judge, J.E. Bono, R. Illies, and M.W. Gerhardt, Personality and leadership: a qualitative and quantitative review. Journal of Applied Psychology, vol. 1, no. 87 pp. 765–780, 2002a.
[31] T.A. Judge, D. Heller, and M.K. Mount, Five-factor model of personality and job satisfaction: a meta-analysis. Journal of Applied Psychology, vol. 87, no. 3, pp. 530–541, 2002b.
[32] T.B. Kashdan, P.E. McKnight, F.D. Fincham, and P. Rose, When curiosity breeds intimacy: Taking advantage of intimacy opportunities and transforming boring conversations. Journal of Personality, vol. 79, no. 6, pp. 1369-1402, 2011.
[33] F. Keusch, C. Zhang, A review of issues in gamified surveys. Social Science Computer Review, vol. 35, no. 2, 147-166, 2017.
[34] J.J. Lee, P. Ceyhan, W. Jordan-Cooley, W. Sung, GREENIFY: A real world action game for climate change education. Simulation & Gaming, vol. 44, no. 2–3, pp. 349-365, 2013.
[35] M. Li, Q. Jiang, C.H. Tan, and K.K. Wei, Enhancing User–Game Engagement Through Software Gaming Elements. Journal of Management Information Systems, vol. 30, no. 4, pp. 115-149, 2014.
[36] C. Lister, J.H. West, B. Cannon, T., Sax, D. Brodegard, Just a fad? Gamification in health and fitness apps. JMIR serious games, vol. 2, no. 2, 2014.
[37] D. Liu, R. Santhanam, J. Webster, Towards meaningful engagement: a framework for design and research of gamified information systems, MIS Quarterly, vol. 41, no. 4, pp. 1011-1034, 2017.
[38] A. Mavletova, Web surveys among children and adolescents: is there a gamification effect? Social Science Computer Review, vol. 33, no. 3, pp.372-398, 2015.
[39] R.R. McCrae, and O.P. John, An introduction to the five-factor model and its applications. Journal of personality, vol. 60, no. 2, pp. 175-215, 1992.
[40] D. Nettle, The evolution of personality variation in humans and other animals. American Psychologist, vol. 61, no. 6, pp. 622, 2006.
[41] T.W.H. Ng, L.T. Eby, K.L. Sorensen, and D.C. Feldman, Predictors of objective and subjective career success: A meta-analysis. Personnel Psychology, vol. 58, no. 2, pp. 367–408, 2005.
[42] C. Nieß, and H. Zacher, Openness to experience as a predictor and outcome of upward job changes into managerial and professional positions. PloS one, vol. 10, no. 6, 2015.
[43] E.E. Noftle, and R.W. Robins, Personality predictors of academic outcomes: big five correlates of GPA and SAT scores. Journal of personality and social psychology, vol. 93, no. 1, pp. 116, 2007.
[44] H.L. O'Brien, and E.G. Toms, The development and evaluation of a survey to measure user engagement. Journal of the American Society for Information Science and Technology, vol. 61, no. 1 pp. 50-69, 2010.
[45] P.M. Podsakoff, S.B. MacKenzie, J.Y. Lee and N.P. Podsakoff, Common method biases in behavioral research: a critical review of the literature and recommended remedies. Journal of applied psychology, vol. 88, no. 5, pp. 879-903, 2003.
[46] N.P. Podsakoff, S.W. Whiting, D.T. Welsh, and K.M. Mai, Surveying for “artifacts”: The susceptibility of the OCB–performance evaluation relationship to common rater, item, and measurement context effects. Journal of Applied Psychology, vol. 98, no. 5, pp. 863-874, 2013.
[47] G. Saucier, and S. Srivastava, What makes a good structural model of personality? Evaluating the Big Five and alternatives. Handbook of personality and social psychology, vol. 3, pp. 283-305, 2015.
[48] S.E. Seibert, and M.L. Kraimer, The five-factor model of personality and career success. Journal of Vocational Behavior, vol. 58, no. 1 pp. 1–21, 2001.

[49] M. Selfhout, W. Burk, S. Branje, J. Denissen, M. Van Aken, W. Meeus, Emerging late adolescent friendship networks and Big Five personality traits: A social network approach, Journal of personality, vol. 78, no. 2, pp. 509-538, 2010.
[50] A. Suh, C.M.K. Cheung, M. Ahuja, and C. Wagner, Gamification in the Workplace: The Central Role of the Aesthetic Experience. Journal of Management Information Systems, vol. 34, no. 1, pp. 268-305, 2017.
[51] J. Tang, P. Zhang, Exploring the relationships between gamification and motivational needs in technology design, International Journal of Crowd Science, vol. 3, no. 1, pp.87-103, 2019.
[52] P. Tolmie, A. Chamberlain, S. Benford, Designing for reportability: Sustainable gamification, public engagement, and promoting environmental debate. Personal and Ubiquitous Computing, vol. 18, no. 7, pp. 1763-1774, 2014.
[53] J.H. Wayne, N. Musisca, and W. Fleeson, Considering the role of personality in the work–family experience: Relationships of the big five to work–family conflict and facilitation. Journal of vocational behavior, vol. 64, no. 1, pp. 108-130, 2004.
[54] K. Werbach, and D. Hunter, For the Win: How Game Thinking Can Revolutionize Your Business, Philadelphia, PA, Wharton Digital Press, 2012.
[55] B. Wille, F. De Fruyt, and M. Feys, Vocational interests and Big Five traits as predictors of job instability. Journal of Vocational Behavior, vol. 76, no. 3, pp. 547–558, 2010.
[56] N. Xi, J. Hamari, The relationship between gamification, brand engagement and brand equity Proceedings of the 52nd Annual Hawaii International Conference on System Sciences (HICSS), 2019.